

REMARKS AND ARGUMENTS

Claims 28-33, 35-53 and 55-70 are currently in the application. Claims 28-33, 35-49, and 70 have been allowed. Claims 50-53 and 55-69 are presented for reconsideration and reexamination in accordance with the remarks and arguments below.

In the prior art rejections of the Office Action, the Examiner rejected Claims 50-53 and 55-57 under 35 U.S.C. §103(a) as being obvious by Ibiden Co., Ltd.'s prior European Patent Application EP 0 816 065 A1 (Naruse et al.) (hereinafter sometimes referred to as "the EP reference") in view of Japanese Patent Publication No. 6-182228 (hereinafter sometimes referred to as "the JP reference"); and, rejected Claims 58-69 under 35 U.S.C. §103(a) as being unpatentable over the EP reference in view of the JP reference.

The Examiner also objected to the informal drawings, requiring correction thereof. The Examiner further suggested to claim 36 as containing a grammatical error and objected to claim 52 as being improper for failing to further limit the subject matter of a previous claim.

The Examiner stated that claims 28-33, 35-49 and 70 are allowed, for which Applicant thanks the Examiner.

By this Amendment, claims 36, 52, 55, 58 and 59 have been amended and the remaining claims are unchanged.

The present invention is directed to a ceramic filter that has specific characteristics. In amended independent claims 50 and 58, the filter is formed from a sintered α -type silicon carbide. The amendments to independent claims 50 and 58 bring the claims in line with the allowed independent claims, namely that the filter is formed from a sintered α -type silicon carbide.

Objection to Claims 36 and 52

The Examiner objects to claim 36 as being informal for missing a period at the end of the claim. Applicant thanks the Examiner for the suggestion of amending the claim, and has done so in accordance with the Examiner's suggestion. Thus, Applicant requests the Examiner to reconsider and withdrawal this objection to claim 36.

The Examiner also objects to claim 52 as failing to further limit a previous claim. Applicant has amended claim 52 to further limit claim 50, from which it depends, thus rendering this objection moot. Applicant respectfully submits that claim 52 now further limits the claim from which it depends. Therefore, Applicant respectfully requests reconsideration and withdrawal of the objection to claim 52.

Rejections under 35 USC § 103

Claims 50-53 and 55-57, as well as claims 58-69, have been rejected as being obvious over EP 0816065A1 (Naruse et al., "the EP reference") in view of JP 6-182228 ("the JP reference"). By this amendment to claims 50 and 58, each of these independent claims has been amended by restricting the material of the filter, i.e. restricting the material to α -type silicon carbide. The EP0816065 (Naruse et al.) reference actually discloses DPF formed from silicon carbide. However, when the examples of filters recited in this reference are reviewed, it becomes apparent that the filter is formed from α -type silicon carbide and β -type silicon carbide.

In contrast to this, the present invention as now claimed in independent Claims 50 and 58 is directed to a honeycomb filter which is formed from α -type silicon carbide. As has been explained in a previously-filed response, the basic unit of a silicon carbide crystal is a regular tetrahedron consisting of Si and C. The basic unit shows a polygonal shape owing to arrangement of the tetrahedrons. A physical property value differs based on such a polygonal shape. Arrangement of each tetrahedron shows a Si atom only on one surface of a crystal and a C atom on the other side thereof; hence the crystal sometimes has electric polarity or different chemical reactivity.

The filter according to the present invention is formed from sintered α -type silicon carbide. Therefore, the use of

the sintered α -type silicon carbide lessens the the arrangement in different directions, stacking faults and other disadvantages resulting from the mixture of β -type silicon carbide as disclosed in the EP reference.

Because chemical properties such as thermal conductance and the like are different for the different types of silicon carbide, the present invention is produced with a different material than contemplated in the EP reference. For that reason, the thermal conductance of a filter (segment) in case of using α -type silicon carbide has been greatly improved over prior art filters using a different silicon carbide. The present inventors have found that the use of a thickness and a thermal conductance of a seal layer as claimed can withstand a thermal shock as a whole.

The filter according to the present invention is characterized in a filter having a low pressure loss by having the claimed pore size and increasing of the through pores in the filter while using sintered α -type silicon carbide within the filter.

Generally, as silicon carbide is hard to be sintered, sintering is generally made by adding a sintering assistant or the like. However, when a greater degree of sintereing is achieved by adding such assistants, impurities are added as

viewed from a finished silicon carbide and a more densified filter is obtained. As a result, the useful open pores of such a filter are clogged, and independent pores in a gap between grains are included. Therefore, even if the porosity is substantially high, if there are many independent pores, the filtering function of the filter is reduced. However, a reduction of the pressure loss across the filter cannot be measured. One of the accomplishments of the present invention is a reduction of independent pores and an increase in open pores. Hence, sintering can be carried out by using a silicon carbide having a different grain diameter.

It is confirmed that the EP reference discloses DPF of silicon carbide (average pore diameter 10 μm and porosity 43%), but, as stated above, the material in the EP reference does not provide the same properties as the claimed sintered α -type silicon carbide of independent claims 50 and 58.

JP 6-182228 was used to reject claims 50-53, 55-57 and 58-69 in combination with the EP reference. The JP reference discloses manufacturing a catalyst support which consists of silicon carbide compact with a large specific surface area and pore volume. However, a review of the Example in paragraph [0017] of the English translation reveals that the JP reference is drawn to a combination of α -type silicon carbide and β -type silicon

carbide, just as the EP reference is also drawn to a combination of α -type silicon carbide and β -type silicon carbide.

Therefore, the same comments made above with respect to the EP reference also apply to the JP reference, namely that the disclosure of a mixture of α -type silicon carbide and β -type silicon carbide is not the same as the claimed composition of α -type silicon carbide, since the properties of the combination of silicon carbides is different than the claimed composition of sintered α -type silicon carbide. Assuming *arguendo* that the reference were combined in an attempt to achieve the subject matter of the present claims, the product resulting from the combination of references would still contain both α -type silicon carbide and β -type silicon carbide since both references disclose the use of the combination of types of silicon carbide. As such, the combination of references does not disclose all of the limitations of independent claims 50 and 58, and as such, does not render the claims obvious thereover.

Therefore, Applicant submits that, even in combination, the present invention as claimed in amended Claims 50 and 58 are not rendered obvious by the combination of references. Since the independent claims are not rendered obvious over the combination of references, Applicant submits that the dependent claims, which necessarily contain all of the limitations of the claims from

which they depend, are also not rendered obvious over the combination of the EP reference in view of the JP reference.

Accordingly, Applicant respectfully request reconsideration and withdrawal of the rejection of claims 50-53, 55-57 and 58-69 as being obvious over the combination of the EP reference in view of the JP reference.

Miscellaneous

Claim 55 has been amended to change the dependency thereof from currently amended Claim 50 to currently amended Claim 52. When the limitations of impurities was deleted from claim 50 and added to Claim 52, there was no longer any antecedent basis for the limitations of Claim 55 in amended claim 50. Accordingly, the dependency of Claim 55 is now on Claim 52 and antecedent basis for the limitations of Claim 55 has been restored.

Allowed Subject Matter

The Examiner indicates that claims 28-33, 35-49 and 70 are allowed. Applicant thanks the Examiner for this indication.

CONCLUSION


In light of the foregoing, Applicant further submits in addition to the arguments in the previously filed Amendment, that the application is in condition for allowance. If the Examiner believes the application is not in condition for allowance,

Applicant respectfully requests that the Examiner contact the undersigned attorney if it is believed that such contact will expedite the prosecution of the application.

Respectfully submitted,
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